

# **Proposal for Monitoring Relocated Unionids near Ripley, Ohio, 1997**

**Prepared for:**

**Mussel Mitigation Trust Fund Committee**  
Cincinnati, Ohio

**Prepared by:**

**Ecological Specialists, Inc.**  
St. Peters, Missouri

**January 1997**

(ESI Proposal # P97-003)



**MUSSEL MITIGATION  
TRUST**

February 10, 1997

Dr. Richard Neves  
Virginia Polytechnic Institute  
Department of Fisheries and Wildlife Sciences  
Blacksburg, VA 24061-0321

Dear Dr. Neves:

RE: PEER REVIEW OF RESEARCH PROPOSAL ENTITLED;  
PROPOSAL FOR MONITORING RELOCATED UNIONIDS  
NEAR RIPLEY, OHIO, 1997

Enclosed please find the above-listed proposal for your review. Also enclosed is a blank peer review form. Please fill out the form and return to me, per instructions in the letter from Wayne Davis, of the Mussel Mitigation Trust. Failure to respond within 30 days constitutes your approval of the proposal.

If you have any questions, please call me at 513/287-2239.

Very truly yours,

A handwritten signature in cursive script, appearing to read "Robert C. Schnelle".

ROBERT C. SCHNELLE  
Alternate Trustee  
Mussel Mitigation Trust

enclosures



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## 1.0 Introduction

Wm. H. Zimmer Plant, jointly owned by Cincinnati Gas and Electric Company, Dayton Power and Light Company, and Columbus Southern Power Company (owners), was initially planned as a nuclear power facility, but was converted to a coal-fired facility before completion. Permits, under Section 404 of the Clean Water Act and Section 10 of the 1899 Rivers and Harbors Act, were required for construction of a barge fleeting and coal unloading facility. The fleeting area fell within a large diverse unionid bed (Stansbery and Cooney, 1985). To mitigate impacts to this unionid bed, the owners were required to relocate 5,000 unionids from potential impact areas to an upstream unionid bed, and establish a trust fund for relocated unionid monitoring and Ohio River basin unionid research. The Mussel Mitigation Trust Fund Committee (MMTFC) administers the trust fund.

In May 1987, 5,158 unionids of 22 species were relocated from the fleeting area to a 500ft transect established near Ohio River Mile (ORM) 418.5. Unionids were monitored in October 1987, August 1988, August 1989, and August 1990 (Dunn, 1991). Recovery of live unionids declined with time and averaged 35% in 1990 (Dunn, 1991).

The objectives of this study will be to re-establish the relocation transect, and estimate survival, growth, and movement of unionids 10 years after relocation.



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## **2.0 Scope of Work**

### **2.1 Transect Location**

Following the initial relocation (1987) and each monitoring effort, the position of the upstream and downstream ends, as well as, 100ft intervals of the 500ft transect line were recorded from a known point with a Theodolite/Electronic Distance Meter (EDM). An EDM will therefore be used to facilitate re-establishing these points and the transect corridor in 1997. A cinder block attached to a buoy will be placed at each surveyed point (0, 100, 200, 300, 400, and 500ft), and a diver will search for previous markers (chimney blocks) and tagged unionids. Once points within the relocation corridor are identified, a 500ft line marked at 5ft intervals will be established. Points will be recorded with a Trimble Basic Pathfinder Plus (GPS) after completing the monitoring study for future reference.

### **2.2 Quantitative Sampling**

Approximately 25% of the area along the transect corridor will be sampled. Sample areas were randomly selected in previous monitoring studies and many of the transect sections have previously been sampled. Therefore, this study's samples will be collected from four transect areas not previously sampled or only overlap small parts of previously sampled sections (Figure 2-1). Since unionids were initially placed and recorded in 10 x 5ft sections, samples will be collected from a 5ft x 5ft quadrat divided into two subquadrats. Sampling will begin adjacent to the line at the upstream end of each sample area. Adjacent quadrats will be sampled riverward and shoreward of the line until few or no tagged unionids are collected, thus establishing the riverward and shoreward limits of the "transect corridor". Three adjacent 10ft sections of the transect corridor will be sampled in each area (see Figure 2-2).

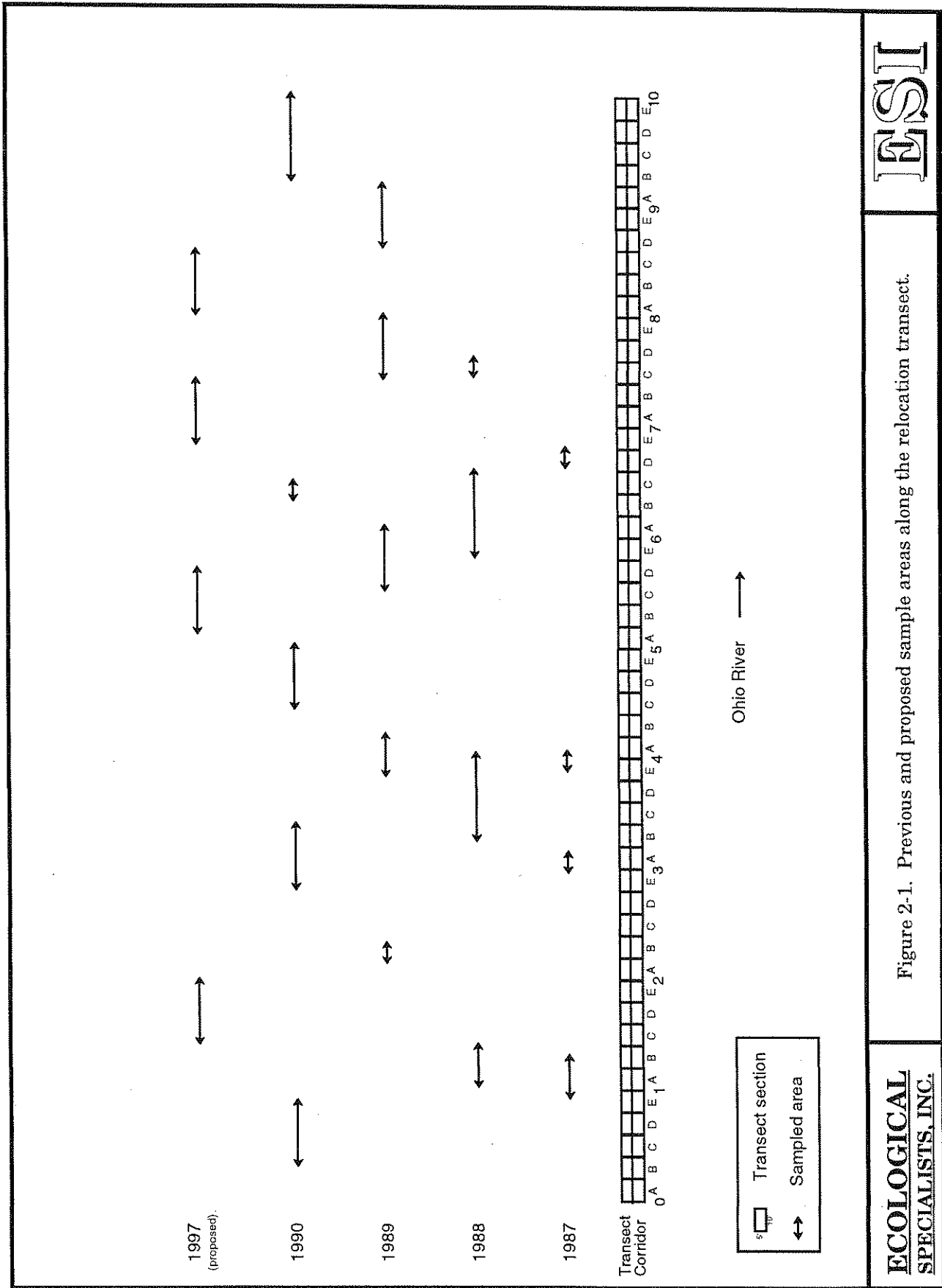
Subquadrats will be treated as separate samples. For each subquadrat, the diver will disturb substrate to a depth of approximately 6in and collect all unionids encountered (visually or tactually) into mesh bags marked with the quadrat position. Bags will be retrieved by malacologists and all collected unionids will be identified, measured (length in mm), weighed (gms), and checked for reproductive condition (sexually dimorphic species only). Tag numbers and condition, and shell condition will be noted. A diver will return all collected unionids to their respective subquadrat following processing.

### **2.3 Qualitative Sampling**

Unionids were initially placed within 5ft of the original transect line, most were recovered within 10ft of the original line in 1990, and most unionids are expected to be within 15ft of the original transect line in 1997. However, a few relocated unionids were found up to 70ft from the transect line in 1990.

Therefore, four lines established perpendicular to the transect line will be qualitatively searched (visually and tactually) for relocated unionids. Lines (100ft) marked at 5ft intervals will be established perpendicular to, and riverward and shoreward of the transect line at the upstream end of each sample

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**ESI**

Figure 2-1. Previous and proposed sample areas along the relocation transect.

**ECOLOGICAL  
SPECIALISTS, INC.**

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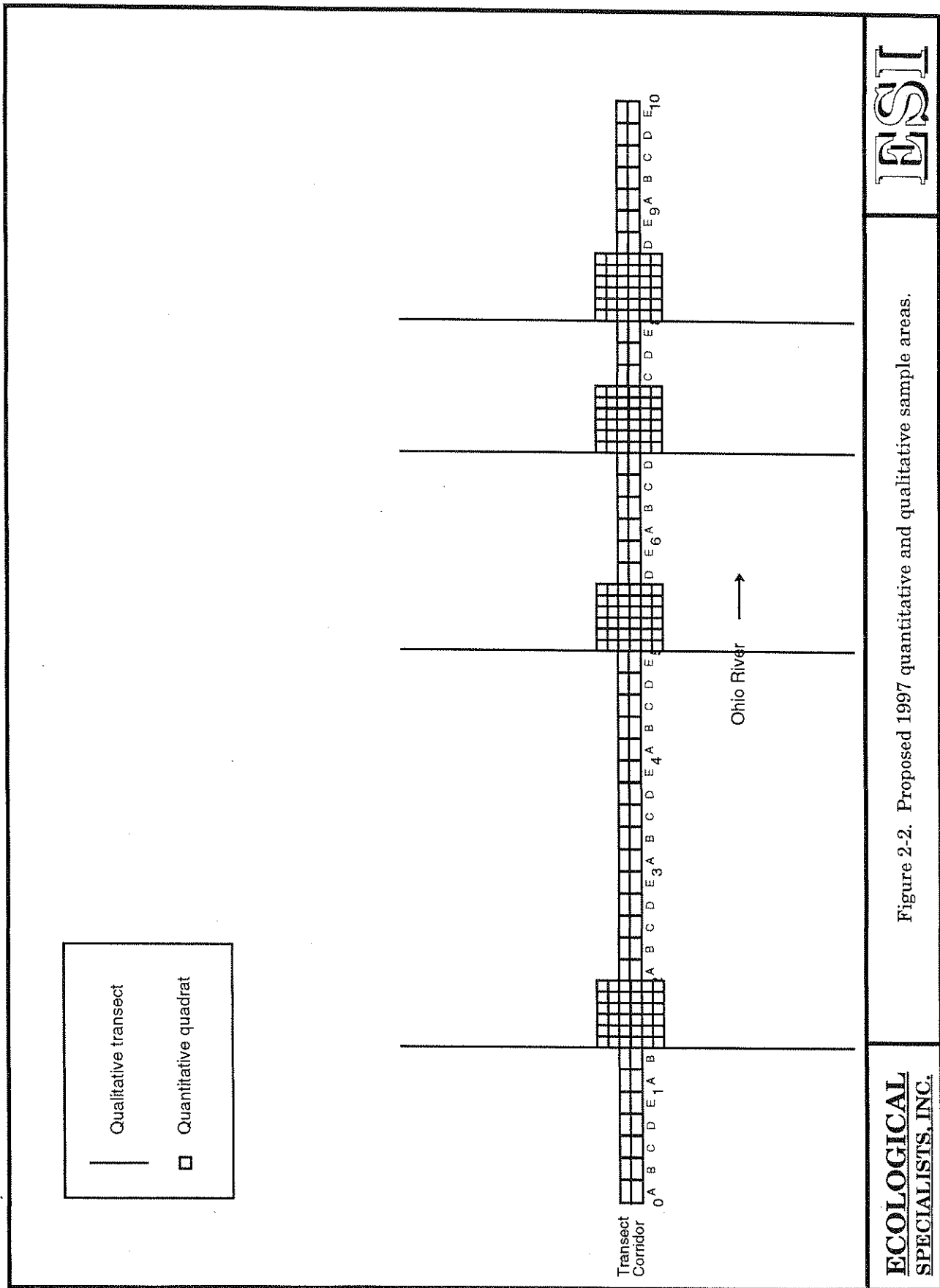


Figure 2-2. Proposed 1997 quantitative and qualitative sample areas.

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area (see Figure 2-2). A diver will traverse the lines collecting all unionids within an arms reach on the downstream side of the line. All collected unionids will be retrieved, processed as previously mentioned for quantitative samples, and returned to their collected location. The diver will relay the position and tag number of relocated unionids to the surface crew.

#### 2.4 Habitat Characteristics

Dissolved oxygen, water temperature, and Secchi disk depth will be recorded daily during sampling. Substrate characteristics (%boulder, cobble, gravel, sand, silt, and clay) will be visually estimated by the diver in each subquadrat.

#### 2.5 Data Analysis and Report

Data will be analyzed to estimate relocated unionid recovery, survival, mortality, growth, and movement. These parameters will be compared among monitoring years with appropriate statistics where possible. Data will also be analyzed for differences in survival among substrate types and species. A report will be prepared describing methods and results, and discussing results with respect to other relocations.



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### **3.0 Schedule**

The field effort will be conducted between June and September under low flow conditions, and will require approximately 12 days. One or two days will be required to locate and re-establish the transect line, eight days will be required for quantitative sampling, and two days will be required for qualitative sampling.

Data analysis and report preparation will begin immediately following the field effort. Three copies of a draft report will be submitted to MMTFC by 31 December 1997. Any comments or corrections will be incorporated into the report and three copies of the final report will be submitted to MMTFC within 30 days of receiving their comments. Study results will be presented at a MMTFC meeting at their request.

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#### 4.0 Key Personnel

Ms. Heidi Dunn (Ecological Specialists, Inc.) will be the principal investigator for this project and Mr. Jim Duckworth (Ducktrail Ecological Services) will be the lead diver. Ms. Dunn and Mr. Duckworth have worked together on numerous unionid surveys, relocations, and monitoring studies since 1992. Ecological Specialists, Inc.'s staff currently consists of two malacologists (Mr. Bernard Sietman and Mr. Dan Kelner) in addition to Ms. Dunn, and two invertebrate ecologists (Ms. Melissa Moore and Mr. Eric Nelson), who will assist with the field effort and data analysis as needed.

##### Ms. Heidi L. Dunn

Ms. Dunn successfully founded and incorporated Ecological Specialists, Inc. (ESI) in 1990 and is currently president of the company. She is dedicated to providing high quality service to all clients. Since incorporation in July 1990, she has successfully completed numerous projects dealing with fish, invertebrates, and freshwater mussels throughout the Midwest primarily for regulatory purposes. She was previously employed by Environmental Science and Engineering, Inc. (ESE), where she served as Ecology Group Leader. While with ESE she was principal investigator on most projects involving unionids, aquatic invertebrates, and fish.

Ms. Dunn has been in the ecological consulting business for 16 years. She has conducted faunal inventories, impact analysis, and licensing surveys in Missouri (Meramec, Missouri, Niangua, and Salt Rivers), Illinois (Embarras, Illinois, and Saline Rivers, as well as, smaller Wabash and Ohio River tributaries), Indiana (Mississinewa, Salamonie, Tippecanoe, and White Rivers), Kentucky (Rough River), Ohio (Muskingum River), Pennsylvania (Allegheny River), West Virginia (Elk and Kanawha Rivers), Wisconsin (St. Croix and Wolf River), and throughout the Ohio and Mississippi Rivers. She has also collected in the Green River, Barren River, and Licking River (Kentucky), Clinch River (Virginia), Duck River (Tennessee), and Chattahoochee River (Georgia).

She is experienced in project management, as well as, being familiar with midwestern species of unionid mussels, oligochaetes, fish, zebra mussels, Asiatic clams, other invertebrates, big river and small stream sampling techniques (both quantitative and qualitative), mark/recapture techniques, impact assessment, and quality assurance/control procedures. Her project experience includes all studies conducted by ESI, as well as, a number of inventories and assessment studies she managed or played a key role in during previous employment. She completed her masters thesis on unionid relocation and four years of monitoring in the Ohio River.

##### Ducktrail Ecological Services: Mr. James R. Duckworth

Mr. Duckworth operates a commercial diving company, Ducktrail Ecological Services, in Lebanon, Tennessee. His experience includes commercial clamming, and malacological surveys. He initially

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became involved with unionids as a commercial clammer; collecting, buying and selling unionids throughout the Mississippi River and Ohio River basins. He has assisted the State of Tennessee with locating unionid beds for mussel sanctuary designation and assisted Dr. David Stansbery of Ohio State University with a survey of the Muskingum River in Ohio. In 1991 and 1992, he assisted Dr. Arthur Clarke of ECOSEARCH, Inc. with unionid surveys in Wisconsin, Minnesota, and West Virginia. Since 1992, Mr. Duckworth has assisted ESI with unionid surveys throughout the Ohio and Mississippi Rivers, and Chattahoochee River (Georgia), Rock River (Illinois), St. Croix and Wolf Rivers (Wisconsin), Meramec River (Missouri), Muskingum River (Ohio), and Allegheny River (Pennsylvania). He was the lead diver on a Meramec River relocation (over 4,000 unionids), three St. Croix River relocations (39,000 unionids), and a Wolf River relocation (over 26,000 unionids), and has assisted with monitoring these relocations.

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## 5.0 Cost Proposal

Ecological Specialists, Inc.'s price to monitor relocated unionids at Ripley, Ohio and prepare a report is \$37,000.00 (Table 5-1). This price is based on the above scope of work. If the transect corridor is located (cinder blocks marking the transect and/or a corridor of tagged unionids is found), the above scope of work will be completed and MMTFC will be billed for costs outlined in Table 5-1. If the relocation transect corridor cannot be located after a reasonable effort (two days), MMTFC will be contacted and options discussed. MMTFC will be billed for fixed costs (Table 5-2) and dive days (Table 5-3).



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Table 5-1. ESI's price to monitor relocated unionids near Ripley, Ohio in 1997.

Task	Item/personnel	No. of units	Units	Price <sup>1</sup>	
<u>Mobilization/ management/ meeting</u>	HLD	12	hours	\$720.00	
	MM	20	hours	\$520.00	
	DEK	4	hours	\$160.00	
				flight/per diem/car	\$600.00
				frames	\$25.00
				blocks	\$30.00
				line	\$75.00
				traffic signs	\$50.00
				permits	\$100.00
		<i>subtotal</i>			<i>\$2,280.00</i>
<u>Travel to site</u>	HLD	20	hours	\$1,200.00	
	MM	20	hours	\$520.00	
	Dive Team	1	trip	\$800.00	
				mileage (ESI/Ducktrail)	1400
				per diem	2
		<i>subtotal</i>			<i>\$3,114.00</i>
<u>Field Sampling</u>	HLD	128	hours	\$7,700.00	
	MM	128	hours	\$3,320.00	
	Dive Team	12	days	\$11,400.00	
				per diem	24
				boat rental	12
				meters	12
				GPS	1
				theotolite/EDM	2
				mileage	1200
		<i>subtotal</i>			<i>\$26,422.00</i>
<u>Report</u>	HLD	60		\$3,600.00	
	MM	20		\$520.00	
	data entry	32		\$992.00	
				misc office costs (copies, phone computer)	\$72.00
		<i>subtotal</i>			<i>\$5,184.00</i>
<b>Total</b>				<b>\$37,000.00</b>	

<sup>1</sup>Includes overhead and profit

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Table 5-2. ESI's fixed costs to mobilize to Ripley, Ohio in 1997.

Task	Item/personnel	No. of units	Units	Price <sup>1</sup>
<u>Mobilization/ management</u>	HLD	4	hours	\$240.00
	MM	20	hours	\$520.00
	DEK	4	hours	\$160.00
	frames			\$25.00
	blocks			\$30.00
	line			\$75.00
	traffic signs			\$50.00
	permits			\$100.00
	<i>subtotal</i>			<i>\$1,200.00</i>
	<u>Travel to site</u>	HLD	20	hours
MM		20	hours	\$520.00
Dive Team		1	trip	\$800.00
mileage (ESI/Ducktrail)		1400	miles	\$434.00
per diem		2	days	\$160.00
<i>subtotal</i>				<i>\$3,114.00</i>
<b>Total</b>			<b>\$4,314.00</b>	

<sup>1</sup>Includes overhead and profit

Table 5-3. ESI's price per dive day.

Item/personnel	No. of units	Units	Price <sup>1</sup>
HLD	10	hours	\$600.00
MM	10	hours	\$260.00
Dive Team	1	day	\$925.00
per diem	2	days	\$160.00
boat rental	1	day	\$75.00
meters	1	day	\$5.00
GPS	1	day	\$50.00
theotolite/EDM	1	week	\$350.00
mileage	100	miles	\$31.00
<b>Total per day</b>			<b>\$2,456.00</b>

<sup>1</sup>Includes overhead and profit

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